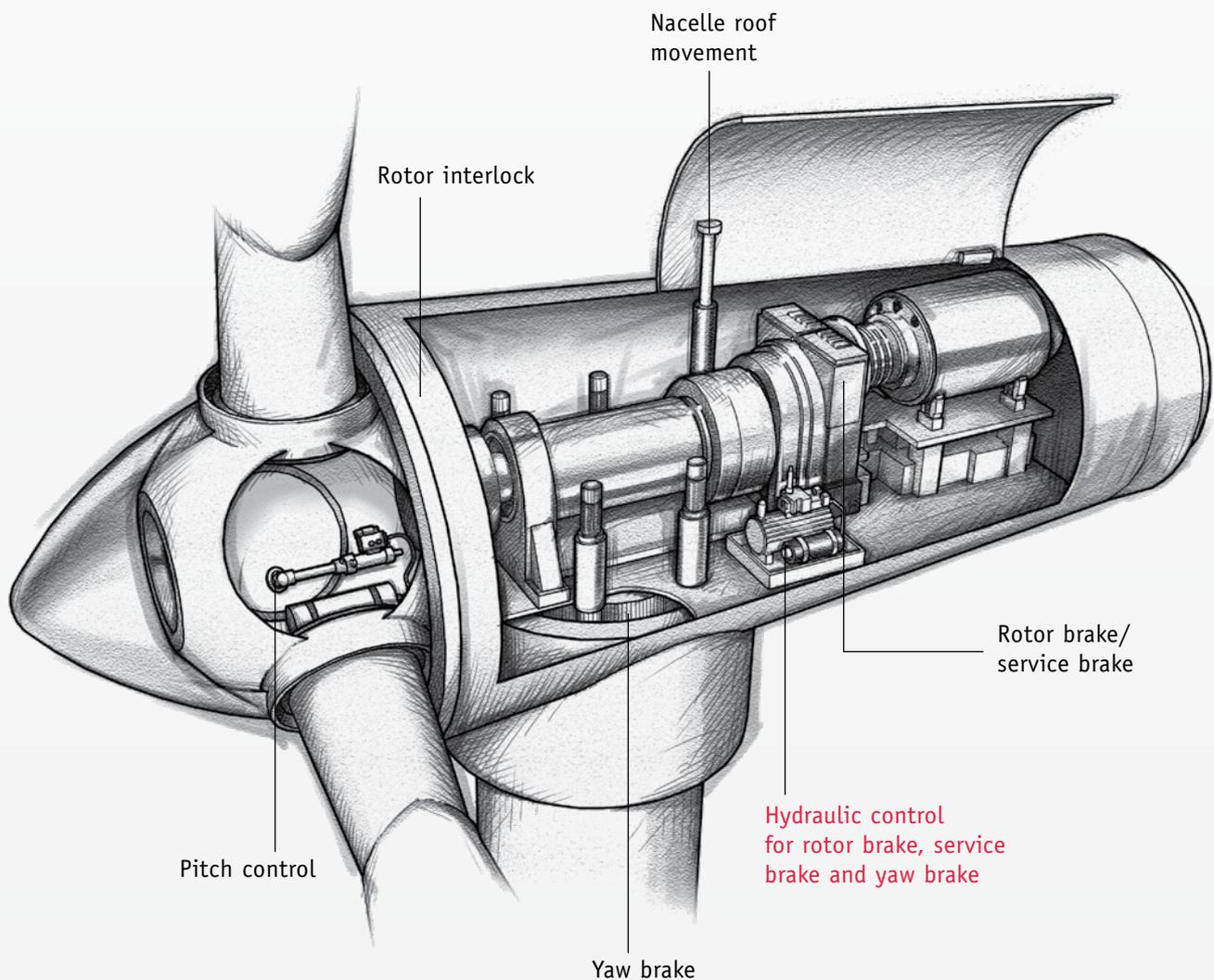


Keeping the nose in the wind – for renewable energy.



Wind is an indispensable part of the mix of renewable energy sources. Wind turbines are getting larger, safer and more efficient. Hydraulics control important functions during operation of wind turbines, both onshore and offshore. Intelligent and durable hydraulic solutions make an important contribution to raise the system reliability.

HAWE Hydraulik: powering your success.

Wind farms face more than just wind.

Wind turbines are not only challenged by wind. They must withstand foreseeable as well as unforeseeable adverse environmental factors, including:

- extreme temperature fluctuations
- salt air in off-shore operations
- high levels of humidity
- storms and severe weather

These stresses occurring during general operation are regulated in compliance with GL (Germanischer Lloyd) safety standards and are regularly reviewed through this independent institution. The demands of the operators are clearly stated as well. The wind turbines should operate reliably every day, for at least 25 years. Only then, they can be considered an economical alternative to other power plants. A technical availability of 98 % has already been reached and sets the standard in machine and plant engineering.



Photo: ThorntonBank

Come wind, rain or shine. HAWE's hydraulics work.

A hydraulic system solution that easily can be integrated into the complete plant ensures the wind turbine will run smoothly under all circumstances and in compliance with all safety standards.

The solutions by HAWE Hydraulik are modular and scalable as necessary. This facilitates design, installation and maintenance. Intelligent modules even with standard interface CETOP 3 are available for all kinds of functions. In case of later modification or maintenance, the modules can easily be exchanged, simply by undoing four screws. Whether it is a hydraulic unit, valve bank or a single valve, the components of HAWE Hydraulik take up little space through their small sizes and can thus be easily integrated even when space is limited.

In addition, they are designed for operating pressures up to 400 bar

and therefore durable and robust in medium pressure ranges.

We offer hydraulic control systems for:

- pitch control
- rotor and service brake
- azimuth brake
- rotor interlock
- nacelle roof movement
- service crane controls

Professional and certified.

Experts from HAWE Hydraulik offer you industry-based and professional advice. We regularly review the compliance with current standards and further develop products accordingly. Sustainable business practices throughout the value creation process is a given for us. Independent experts monitor our processes regularly. Request our certificates or have a look yourself at www.hawe.com.



Photo: HAWE Hydraulik SE

Everything revolves around cost-effectiveness and quality.

HAWE Hydraulik offers reliable, durable products with a state-of-the-art design. The sophisticated modular system enables you to combine the elements you need in the most cost effective way. A selection from our product range:

Compact brake module for azimuth brakes:

For safety reasons, it is obviously essential that a wind turbine is fitted with brakes that are absolutely reliable. That's why HAWE Hydraulik uses zero-leak directional seated valves in its brake module type NBMC. Compared to directional spool valves, they provide greater switching reliability and meet GL safety standards.

- Operating pressure (p_{max}): 250 bar
- Flow rate (Q_{max}): 20 lpm



Efficient oil supply of the hydraulic control:

The hydraulic power pack type KA is used to supply hydraulic controls in wind turbines with pressurized oil. It can be installed both horizontally and vertically and takes up a minimum amount of space due to its compact design. To cater for different oil volume requirements, the length of the tank can be extended. In case of power outage, a hand pump ensures the operation of all functions. Generally, the unit already meets the standard requirements for use in Cold Climate Version (CCV) areas.

- Operating pressure (p_{max}): 700 bar
- Flow rate (Q_{max}): 10 lpm



Hydraulic control in modular design:

The hydraulic functions such as rotor brake, azimuth brake, rotor blocking, etc. are designed as separate modules which are mounted directly on the power pack. Directional seated valves offer high switching reliability, even after long time periods under pressure. Pressure control valves enable an accurate setting of the breaking pressure. Since flow control valves are load independent, they provide a guaranteed flow rate even when pressure and temperature are changing.

- Operating pressure (p_{max}): 700 bar
- Flow rate (Q_{max}): 10 lpm



Customized power packs for each flow rate:

Customized solutions for applications with higher oil flow rates are supplied ready for plug-and-play installation, so that all desired functions including pitch controls can be supplied and energized with just one compact unit. Electrical consumers are wired to the terminal box or mounted via Harting connector. This provides maximum flexibility in construction and ease of maintenance during use.

- Operating pressure (p_{max}): 700 bar
- Flow rate (Q_{max}): 25 lpm



End-to-end service.

With five sales offices in Germany, 17 subsidiaries worldwide and around 30 expert partner companies, HAWE Hydraulik is bound to have a presence in your area.

HAWE Hydraulik offers the following benefits:

- Comprehensive individual advice and assistance
- Customized solutions
- Products designed and manufactured using state-of-the-art technology
- Many years of experience and expertise in hydraulic products and their uses
- Tailored service and maintenance contracts
- Design, set-up and maintenance/servicing on-site

If you have any questions, please get in touch. Our experts are always happy to help.

